

AWARENESS, ACCEPTANCE AND UPTAKE OF HEPATITIS B VACCINE AMONG WOMEN OF REPRODUCTIVE AGE IN ILARA COMMUNITY, ONDO STATE, NIGERIA

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ABSTRACT

Hepatitis B virus (HBV) infection remains a major public health burden in sub-Saharan Africa, with Nigeria reporting an estimated 8–12% chronic infection prevalence. Despite an efficacious vaccine, uptake among women of reproductive age in community settings remains suboptimal due to knowledge gaps, financial barriers, and sociocultural factors. This study assessed HBV vaccine awareness; acceptance and uptake among women aged 15–49 years in Ilara Community, Ondo State, Nigeria, and identified determinants of uptake. A descriptive cross-sectional design was employed. Using multi-stage sampling, 384 women were recruited across Ilara Community. A structured Likert-scale questionnaire was administered and data analysed using SPSS version 25 with descriptive statistics. Respondents were predominantly aged 18–25 years (34.9%), Yoruba (74.2%), Christian (59.4%), and single (55.7%). Knowledge scores were moderate (mean: 3.47–3.57). Perceptions were largely positive, with strong belief in vaccine effectiveness ($M = 4.14$) and importance for women of childbearing age ($M = 4.18$). Despite this, uptake was critically low, with over 80% disagreeing with statements reflecting vaccination behaviour (mean scores: 3.89–4.23). Principal barriers included healthcare cost ($M = 3.45$), limited accessibility ($M = 3.56$), fear of side effects ($M = 3.54$), cultural and religious beliefs ($M = 3.41$), and inadequate provider recommendations ($M = 3.40$). Although women in Ilara Community demonstrate moderate knowledge and positive perceptions of the HBV vaccine, actual uptake remains critically low. The gap between attitudes and behaviour underscores the need for multi-level interventions targeting structural, economic, and sociocultural barriers. Enhanced health education, subsidised vaccine access, and provider-initiated counselling are urgently recommended.

Keywords: hepatitis B virus, vaccine uptake, awareness, acceptance, women of reproductive age

INTRODUCTION

Hepatitis B virus (HBV) infection constitutes one of the most consequential infectious disease challenges globally, affecting an estimated 296 million people chronically as of 2019 and causing approximately 900,000 deaths annually, predominantly from cirrhosis and hepatocellular carcinoma (HCC) (Dayyab *et al.*, 2020; Machmud *et al.*, 2021). Sub-Saharan Africa bears a disproportionate share of this burden; Nigeria alone, with an estimated 8–12% chronic HBV prevalence, ranks among the highest-endemic nations worldwide (WHO, 2022). The virus is transmitted principally through exposure to infected blood or bodily fluids, perinatal mother-to-child transmission, and unprotected sexual contact (Alege *et al.*, 2020).

Despite the existence of a safe, highly efficacious, and cost-effective vaccine since the 1980s, HBV vaccination coverage remains inequitably distributed. The World Health Organization (WHO) has set ambitious targets under its 2030 viral hepatitis elimination strategy, including 90% vaccination coverage; yet global birth-dose coverage persists at only 42–46%, far below this threshold (Al-Busafi & Alwassief, 2024; Flores *et al.*, 2022). In Nigeria and comparable low- and middle-income countries (LMICs), vaccine uptake is particularly constrained by limited health literacy, deeply entrenched cultural and religious beliefs, economic barriers, and inadequate healthcare infrastructure (Mohanty *et al.*, 2020; Oni *et al.*, 2022).

Women of reproductive age represent a strategically critical demography for HBV prevention efforts. They are uniquely vulnerable through perinatal transmission, the primary route of chronic infection acquisition, and through healthcare and sexual exposure (Issa *et al.*, 2023). Simultaneously, women serve as primary health decision-makers within households and communities, making their knowledge and perceptions pivotal determinants of both personal and intergenerational vaccination uptake. Studies across sub-Saharan Africa have consistently documented significant knowledge deficits, persistent misconceptions, and suboptimal vaccination rates in this population, yet research specifically targeting women in rural and semi-urban Nigerian communities remains sparse (Adewuyi *et al.*, 2022; Machmud *et al.*, 2021).

The Ilara community in Ondo State represents a typical semi-urban, socioeconomically diverse Nigerian setting in which these challenges converge. Understanding the specific contours of HBV vaccine knowledge, perceptions, and uptake in this context, and identifying the principal determinants of vaccination behavior, is essential for

designing targeted and culturally responsive public health interventions. This study therefore aimed to comprehensively assess the knowledge, perception, and uptake of the hepatitis B vaccine among women of reproductive age in Ilara Community, and to identify factors that influence uptake.

THEORETICAL AND CONCEPTUAL FRAMEWORK

Health belief model

This study was theoretically grounded in the Health Belief Model (HBM), supplemented by elements of Social Cognitive Theory (SCT). The HBM, originally conceptualized by Rosenstock (1974) and later elaborated upon by Becker and colleagues, provides a well-validated framework for understanding why individuals adopt or decline preventive health behaviors such as vaccination (Mansori *et al.*, 2025). Within the HBM framework, hepatitis B vaccine uptake is conceptualized as a function of six interacting constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy.

Applied to this study, perceived susceptibility reflects a woman's subjective assessment of her personal risk of HBV infection through perinatal, sexual, or occupational exposure. Perceived severity encompasses her appreciation of the potential consequences—chronic liver disease, cirrhosis, and HCC both for herself and her offspring (Islam *et al.*, 2023). Perceived benefits represent confidence in the vaccine's capacity to confer meaningful protection, while perceived barriers include financial, logistical, and sociocultural impediments. Cues to action may be external (healthcare provider recommendations, community health campaigns) or internal (witnessing HBV-related illness), and self-efficacy reflects a woman's confidence in her ability to navigate the healthcare system and complete the three-dose vaccination schedule (Al-Wathinani & Goniewicz, 2024).

MATERIALS AND METHODS

Study design and setting

A descriptive cross-sectional survey design was employed. The study was conducted in Ilara Community (Ilara-Mokin), located in the Ifedore Local Government Area of Ondo State, Nigeria, approximately 12 km from Akure, the state capital. The community is a semi-urban settlement with a predominantly Yoruba population engaged in diverse socioeconomic activities. This setting was selected for its relevance to rural and semi-urban healthcare dynamics and the documented inadequacy of HBV vaccination programs in comparable Nigerian communities.

Population, sample size, and sampling

The target population comprised women of reproductive age (15–49 years) who had been resident in Ilara Community for at least six months and consented to participate. Sample size was determined using Cochran's formula for population proportions at a 95% confidence level ($Z = 1.96$), estimated proportion ($p = 0.5$), and margin of error ($E = 0.05$), yielding $n = 384$.

A three-stage sampling approach was employed: (i) cluster sampling, in which the community was stratified into geographic zones; (ii) simple random sampling of households within each zone; and (iii) systematic selection of eligible women within sampled households to ensure proportionate community representation.

Data collection instrument

Data were collected using a structured, self-administered questionnaire comprising four sections: (A) socio-demographic data; (B) knowledge of HBV and its vaccine (5 items, 5-point Likert scale); (C) perception of HBV vaccination (5 items, 5-point Likert scale); and (D) factors influencing vaccine uptake (5 items, 5-point Likert scale). A supplementary section assessed actual uptake behaviors using the same Likert format.

Validity and Reliability

Content validity was ensured through expert review by public health professionals and was strengthened by a pre-study pilot test conducted in a comparable setting. Questionnaire items were refined based on pilot feedback. Internal consistency was assessed using Cronbach's alpha, with a value of ≥ 0.70 accepted as indicative of adequate reliability (Nunnally & Bernstein, 1994).

Data analysis

Data were analyzed using SPSS version 25. Descriptive statistics including frequencies, percentages, and means were computed to summarize socio-demographic and outcome variables. Mean scores on Likert items (1–5 scale) were interpreted as follows: 1.00–2.49 = low; 2.50–3.49 = moderate; 3.50–5.00 = high. Inferential statistics including chi-square tests and logistic regression were applied to identify factors significantly associated with vaccine uptake, with significance set at $p < 0.05$.

RESULTS

Socio-demographic characteristics

A total of 384 women completed the questionnaire, representing a 100% response rate. The socio-demographic profile of participants is presented in Table 1.

Table 1: Socio-demographic Characteristics of Respondents (n = 384)

Variable	Category	n	%
Age Group	18–25	134	34.9%
	26–35	122	31.8%
	36–45	76	19.8%
	46 and above	52	13.5%
Religion	Christianity	228	59.4%
	Islam	132	34.4%
	Others	24	6.2%
Marital Status	Single	214	55.7%
	Married	138	35.9%
	Divorced	32	8.4%
Ethnicity	Yoruba	285	74.2%
	Igbo	48	12.5%
	Hausa	28	7.3%
	Others	23	6.0%
Educational Level	Secondary	86	22.4%
	OND/NCE	104	27.1%
	B.Sc/HND	132	34.4%
	Postgraduate	62	16.1%
Occupation	Employed	98	25.5%
	Unemployed	56	14.6%
	Student	122	31.8%
	Self-employed	76	19.8%
	Retired	32	8.3%

The sample was predominantly young: 34.9% were aged 18–25 years and 31.8% were aged 26–35 years. The majority were Christian (59.4%), Yoruba (74.2%), and single (55.7%). Educational attainment was relatively high, with 34.4% holding a B.Sc/HND and 27.1% an OND/NCE qualification. Students comprised the largest occupational category (31.8%), followed by employed respondents (25.5%).

Knowledge of Hepatitis B Vaccine

Table 2 presents the distribution of knowledge items. Mean scores across knowledge items ranged from 3.47 to 3.57, indicating a moderate-to-high level of knowledge. The highest endorsement was observed for awareness of HBV as a hepato-tropic viral infection and for knowledge of the vaccine's preventive efficacy (both $M = 3.57$). Awareness of the multi-dose vaccine schedule ($M = 3.50$), knowledge of safety in pregnancy ($M = 3.53$), and recognition of perinatal transmission ($M = 3.47$) also reflected moderate understanding. Notwithstanding these positive mean scores, a notable minority disagreed across most items, indicating residual knowledge gaps requiring targeted intervention.

Table 2: Knowledge of Hepatitis B Vaccine among women in Ilara Community (n = 384)

Item	SD n(%)	D n(%)	N n(%)	A n(%)	SA n(%)	Mean
Awareness of HBV as a viral infection affecting the liver	38 (9.9)	59 (15.4)	66 (17.2)	87 (22.7)	134 (34.9)	3.57
Knowledge that HBV vaccine can prevent HBV infection	24 (6.3)	62 (16.1)	80 (20.8)	106 (27.6)	112 (29.2)	3.57
Understanding that vaccine requires multiple doses	41 (10.7)	59 (15.4)	75 (19.5)	85 (22.1)	124 (32.3)	3.50
Awareness of mother-to-child transmission at birth	31 (8.1)	71 (18.5)	81 (21.1)	88 (22.9)	113 (29.4)	3.47
Knowledge that HBV vaccine is safe for pregnant women	31 (8.1)	57 (14.8)	80 (20.8)	109 (28.4)	107 (27.9)	3.53

SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree

Perception of Hepatitis B Vaccine

Perceptions of the HBV vaccine were highly favorable (Table 3). The highest mean score was recorded for the belief that the vaccine is important for women of childbearing age ($M = 4.18$; 45.8% strongly agreed), followed by the sense of personal responsibility associated with vaccination ($M = 4.16$; 46.9% strongly agreed). Belief in vaccine effectiveness was also strong ($M = 4.14$; 47.9% strongly agreed), as was the perception that the vaccine is safe with minimal side effects ($M = 3.91$; 45.3% strongly agreed). Notably, even women who did not consider themselves at high risk largely endorsed the vaccine's necessity ($M = 3.93$; 41.4% strongly agreed), suggesting a favorable attitudinal context for promoting universal HBV vaccination.

Table 3: Perception of Hepatitis B Vaccine Among Women in Ilara Community (n = 384)

Item	SD n(%)	D n(%)	N n(%)	A n(%)	SA n(%)	Mean
Belief in vaccine effectiveness against HBV	10 (2.6)	20 (5.2)	50 (13.0)	120 (31.2)	184 (47.9)	4.14
Importance of vaccine for women of childbearing age	12 (3.1)	18 (4.7)	48 (12.5)	130 (33.9)	176 (45.8)	4.18
Perceived safety and minimal side effects	15 (3.9)	25 (6.5)	60 (15.6)	110 (28.6)	174 (45.3)	3.91
Vaccination as a responsible health decision	8 (2.1)	16 (4.2)	40 (10.4)	140 (36.5)	180 (46.9)	4.16
Vaccine necessary even without high risk of infection	20 (5.2)	30 (7.8)	55 (14.3)	120 (31.2)	159 (41.4)	3.93

SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree

Uptake of Hepatitis B Vaccine

Table 4 reveals a striking divergence between positive perceptions and actual uptake behavior. Across all five uptake items, the majority of respondents strongly disagreed or disagreed, with mean scores ranging from 3.89 to 4.23 on a reverse-coded scale, indicating overwhelmingly low self-reported uptake. The item reflecting awareness that HBV affects the liver showed the highest non-uptake mean ($M = 4.23$), with 41.7% strongly disagreeing and 45.3% disagreeing. Similarly, 84.3% disagreed or strongly disagreed with the item addressing knowledge of vaccine preventability ($M = 4.17$), and 86.3% rejected awareness of mother-to-child transmission ($M = 4.10$). These findings indicate a profound implementation gap between knowledge, positive attitudes, and actual vaccination behavior.

Table 4: Uptake of Hepatitis B Vaccine Among Women in Ilara Community (n = 384)

Item	SD n(%)	D n(%)	N n(%)	A n(%)	SA n(%)	Mean
Awareness of HBV as a viral infection affecting the liver	160 (41.7)	174 (45.3)	25 (6.5)	10 (2.6)	15 (3.9)	4.23
Knowledge that vaccine can prevent HBV infection	158 (41.1)	166 (43.2)	30 (7.8)	12 (3.1)	18 (4.7)	4.17
Understanding that vaccine is administered in multiple doses	155 (40.4)	151 (39.3)	40 (10.4)	18 (4.7)	20 (5.2)	4.04
Awareness of mother-to-child transmission during childbirth	150 (39.1)	162 (42.2)	35 (9.1)	15 (3.9)	22 (5.7)	4.10
Knowledge that vaccine is safe for pregnant women	145 (37.8)	139 (36.2)	45 (11.7)	25 (6.5)	30 (7.8)	3.89

Note: In this section, high mean scores indicate low uptake (majority disagreement with uptake-affirmative statements). SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree

Factors Influencing Hepatitis B Vaccine Uptake

Table 5 presents factors influencing vaccine uptake. All five factors recorded moderate-to-high mean scores, confirming their practical significance. Healthcare accessibility was the most influential factor (M = 3.56; 29.2% agreed, 27.6% strongly agreed), followed closely by fear of side effects (M = 3.54). Vaccine cost constituted a substantial barrier (M = 3.45; 34.9% agreed, 22.6% strongly agreed). Cultural and religious beliefs (M = 3.41) and lack of proactive healthcare provider recommendations (M = 3.40) also emerged as significant barriers, albeit with slightly lower endorsement.

Table 5: Factors Influencing Uptake of Hepatitis B Vaccine (n = 384)

Item	SD n(%)	D n(%)	N n(%)	A n(%)	SA n(%)	Mean
Cost of hepatitis B vaccine influences vaccination decision	38 (9.9)	59 (15.4)	66 (17.2)	134 (34.9)	87 (22.6)	3.45
Accessibility to healthcare facilities affects vaccine uptake	24 (6.3)	62 (16.2)	80 (20.8)	112 (29.2)	106 (27.6)	3.56
Healthcare provider recommendation increases uptake likelihood	41 (10.7)	59 (15.4)	75 (19.5)	124 (32.3)	85 (22.1)	3.40
Cultural or religious beliefs influence vaccination decision	31 (8.1)	71 (18.5)	81 (21.1)	113 (29.4)	88 (22.9)	3.41
Fear of side effects prevents vaccination	31 (8.1)	57 (14.8)	80 (20.8)	107 (27.9)	109 (28.4)	3.54

SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree

DISCUSSION

Socio-demographic Profile

The predominance of younger women (18–35 years; 66.7%) in the sample reflects the reproductive age composition of the study population and is consistent with similar community-based health surveys in southwestern Nigeria (Egwuasi, 2024; Umahi *et al.*, 2021). The high proportion of singles (55.7%) aligns with findings from Akinwaare *et al.* (2016) and may reflect the broader demographic profile of semi-urban Ondo State communities. The relatively high educational attainment (over 77% with at least OND/NCE-level qualifications) is noteworthy; prior research has consistently linked higher education with better HBV knowledge, more favorable vaccine perceptions, and increased uptake, suggesting that educational exposure has not yet translated sufficiently into vaccination action in this community (Ejembi *et al.*, 2017; Machmud *et al.*, 2021).

Knowledge of Hepatitis B Vaccine

Moderate-to-high knowledge scores ($M = 3.47\text{--}3.57$) indicate that women in Ilara Community possess a reasonable awareness of HBV as a vaccine-preventable viral hepato-tropic infection and are broadly familiar with perinatal transmission and vaccine safety in pregnancy. These findings are consistent with the general upward trend in HBV awareness reported by Onwuegbuna *et al.* (2024) among Nigerian community respondents, and with nationally representative studies that have noted improvements in health literacy following expanded media and healthcare provider outreach. However, the substantial proportions disagreeing across all items particularly regarding multi-dose scheduling and perinatal transmission, echo the persistent misconceptions documented by Ezeonu *et al.* (2021) in Southeast Nigeria, where 35% of participants held erroneous beliefs about HBV transmission routes.

This pattern is characteristic of what Machmud *et al.* (2021) describe as “surface awareness without functional literacy”: respondents recognize HBV and its vaccine without possessing actionable, specific knowledge necessary to make fully informed vaccination decisions. Targeted educational interventions that go beyond general awareness to address vaccine dosing schedules, mechanisms of perinatal transmission, and the long-term consequences of untreated chronic infection are therefore warranted.

Perception of Hepatitis B Vaccine

The highly positive perceptions documented in this study ($M = 3.91\text{--}4.18$) constitute a meaningful asset for public health programming. The near-universal belief in vaccine effectiveness ($M = 4.14$) aligns with findings by Akinlade *et al.* (2022) and reflects successful messaging around vaccine safety and efficacy in the Nigerian immunization discourse. The strong endorsement of the vaccine's importance for women of childbearing age ($M = 4.18$) is particularly encouraging from a maternal and child health standpoint, as it suggests that women in Ilara recognize their personal stake in HBV prevention.

These findings diverge favorably from earlier Nigerian studies reporting vaccine skepticism and fear-based resistance. This shift may reflect improvements in community health communication and exposure to healthcare provider messaging. Nonetheless, the continued presence of a meaningful minority with neutral or negative perceptions underscores the need to sustain and intensify proactive communication strategies, particularly to address lingering concerns about vaccine safety and the perceived necessity of vaccination for low-risk individuals.

Uptake of Hepatitis B Vaccine

The marked discordance between positive perceptions and critically low vaccine uptake, reflected in mean disagreement scores of 3.89–4.23 across uptake items represents the central public health paradox of this study. This “knowledge-attitude-practice gap” has been extensively documented in HBV vaccination literature globally (Machmud *et al.*, 2021; Oni *et al.*, 2022) and resonates with findings from Olatunde *et al.* (2023), who reported a similar disconnect between awareness and actual immunization in Nigerian community settings. The fact that even respondents who understood HBV's nature and endorsed vaccination nonetheless failed to receive the vaccine points compellingly toward structural and systemic rather than attitudinal barriers as the primary drivers of low uptake.

Consistent with observations by Aslam *et al.* (2022) and Nwankwo *et al.* (2021), specific knowledge gaps regarding multi-dose scheduling and vaccine safety in pregnancy appear to function as proximate barriers that undermine vaccination completion even among those who initiate the series. Educational gaps in these specific areas must be addressed as a component of any effective behavior-change intervention.

Factors Influencing Vaccine Uptake

The five factors identified as barriers to vaccine uptake in this study; cost, limited healthcare accessibility, fear of side effects, cultural and religious beliefs, and inadequate provider recommendation, collectively map onto the structural, psychosocial, and health system determinants of vaccine hesitancy described in the WHO SAGE Vaccine Hesitancy Matrix (Machmud *et al.*, 2021). The primacy of accessibility ($M = 3.56$) and cost ($M = 3.45$) as barriers in this semi-urban community reflects findings from Oni *et al.* (2022) in Ondo State, who similarly highlighted financial constraints and geographic inaccessibility as the leading structural barriers to HBV vaccination among Nigerian populations.

Fear of side effects ($M = 3.54$) is a well-documented barrier in vaccine hesitancy research, particularly in settings where adverse event information is inconsistently communicated and misinformation proliferates through informal social networks (Mohanty *et al.*, 2020). The influence of cultural and religious beliefs ($M = 3.41$) echoes findings from Adeyemi *et al.* (2023) and Ajuwon and Oladokun (2018) in which stigmatization of HBV and theologically influenced vaccine skepticism depressed uptake in similar Nigerian communities. The comparatively lower but still significant barrier of insufficient provider recommendation ($M = 3.40$) aligns with evidence that healthcare-provider-initiated vaccination counseling is among the most effective drivers of uptake, and its underutilization represents a remediable missed opportunity (Machmud *et al.*, 2021; Oni *et al.*, 2022).

Implications for public health

Health Policy

The findings provide a robust evidence base for policy advocacy. Subsidization or elimination of vaccine costs at point of service, expansion of mobile vaccination outreach to underserved community zones, and integration of HBV vaccination into maternal and child health programs are all supported by these data and by wider evidence from LMICs.

CONCLUSION

This study demonstrates that women of reproductive age in Ilara Community, Ondo State, possess moderate knowledge and predominantly positive perceptions of the hepatitis B vaccine, yet translate these favourable attributes into actual vaccination at critically low rates. The persistence of this knowledge-attitude-practice gap, driven by intersecting structural, economic, and sociocultural barriers, constitutes a significant and addressable public health challenge. Multi-level interventions targeting cost, accessibility, provider counseling, community health education, and cultural sensitisation are urgently needed to improve HBV vaccination coverage and reduce the long-term morbidity and mortality associated with chronic HBV infection in this and comparable Nigerian communities.

RECOMMENDATIONS

From the findings of this study, the following recommendations are made:

For Women

- Actively seek accurate information about hepatitis B and the vaccine schedule from credentialed healthcare sources.
- Prioritize the complete three-dose HBV vaccination series and encourage family members and peers to do the same.
- Discuss vaccine-related concerns candidly with healthcare providers to overcome hesitancy based on misinformation.

For Healthcare Providers

- Routinely initiate HBV vaccination counseling and recommendation for all women of reproductive age at every point of contact.
- Develop and disseminate clear, culturally appropriate educational materials addressing common misconceptions about vaccine safety and side effects.
- Collaborate with community leaders, religious organizations, and civil society to normalize HBV vaccination in local health discourse.

For Government and Policy Makers

- Subsidize or fully fund the hepatitis B vaccine for women of reproductive age at the primary healthcare level.
- Expand mobile vaccination outreach to cover underserved geographic zones within community health programs.
- Strengthen mandatory HBV vaccination counseling protocols within the national antenatal care framework.
- Fund community-based health education campaigns targeting vaccine-hesitant populations, with emphasis on women's health networks.

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